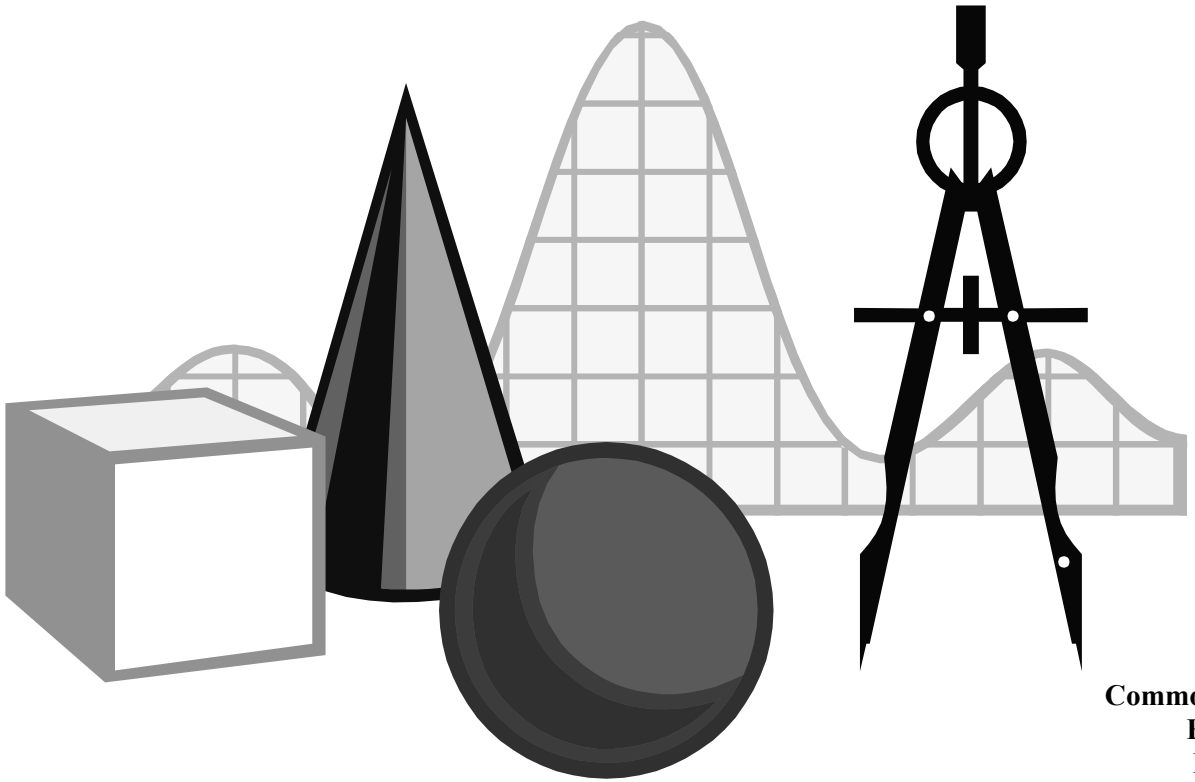
MATHEMATICS STANDARDS OF LEARNING SAMPLE SCOPE AND SEQUENCE

Kindergarten



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Kindergarten Mathematics Standards of Learning Sample Scope and Sequence

by the

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The *Mathematics Standards of Learning Sample Scope and Sequence* and the *Mathematics Standards of Learning Curriculum Framework* can be found in a PDF and Word file format on the Virginia Department of Education's Web site at http://www.pen.k12.va.us.

Kindergarten Mathematics Standards of Learning Sample Scope and Sequence

Preface

As an additional resource to help school divisions develop curricula aligned to the 2001 Mathematics Standards of Learning, the Virginia Department of Education has developed sample scope and sequence documents in kindergarten through grade eight and in core high school courses. These sample documents provide guidance on how the essential knowledge and skills that are identified in the Standards of Learning and the Standards of Learning Curriculum Framework may be introduced to students in a logical, sequential, and meaningful manner.

These sample scope and sequence documents are intended to serve as general guides to help teachers and curriculum developers align their curricula and instruction to support the Standards of Learning. Each sample document is organized around specific topics to help teachers present information in an organized, articulated manner. Also included are correlations to the Standards of Learning for that curricular area for a particular grade level or course, as well as ideas for classroom assessments and teaching resources.

The sample scope and sequence documents are not intended to prescribe how curriculum should be developed or how instruction should be delivered. Instead, they provide examples showing how teachers and school divisions might present to students in a logical and effective manner information that has been aligned with the Standards of Learning. School divisions that need assistance in developing curricula aligned with the Standards of Learning are encouraged to consider the sample scope and sequence guides. Teachers who use the documents should correlate the content identified in the guides with available instructional resources and develop lesson plans to support instruction.

Copies of the sample scope and sequence guides are available at http://www.pen.k12.va.us in both PDF and Microsoft Word formats. These materials are copyrighted, and all rights are reserved. Reproduction of these materials for instructional purposes in Virginia classrooms is permitted.

Kindergarten Mathematics Standards of Learning Sample Scope and Sequence

Introduction

The elementary school sample mathematics scope and sequence is based on the essential knowledge and skills identified in the Mathematics Standards of Learning Curriculum Framework. The sample scope and sequence is indexed by organizing topics reflective of the big ideas contained within the grade level curriculum and correlated to the Mathematics Standards of Learning. It is not intended to be a complete list of all the lessons that need to be taught and mastered during each elementary school grade, yet it sets forth a comprehensive set of instructional expectations that students should master to successfully achieve the grade level standards.

A primary purpose of this document is to offer teachers and curriculum developers one way to sequence and focus their curricula. Teachers may restructure the organizing topics into an instructional program that is inclusive, but better aligned with the available instructional resources (e.g., textbooks, supplemental resource materials, and technological support materials). Once the instructional materials for a scope and sequence are identified, teachers should give consideration to an alignment of the instructional time for each of the topics contained within an assessment reporting category or to the weight of the reporting category.

Effective mathematics teaching requires understanding what students know and need to learn and then challenging and supporting them to learn it well. The resources section included in the sample scope and sequence document provides a list of manipulatives that may be used in the instructional lessons for the development of the concepts related to the content standards. It also includes page references to the Mathematics Curriculum Framework where instructional strategies and further information can be found for teaching the particular concepts and skills. Additionally, within the resource area, staff development resource documents produced by the Department of Education are listed and can be found on the Department of Education's Web site at www.pen.k12.va.us.

Assessments should support the learning of important mathematics and provide useful feedback to both teachers and students. The classroom assessment methods section in this sample scope and sequence lists a few types of the tests, tasks, and observations that should be used in assessing the student's progress. When teachers select assessment methods, they should ensure that all students have the opportunity to clearly and completely demonstrate what they know and are able to do. Whether the focus is on formative assessment aimed at guiding instruction, or on summative assessment of the student's knowledge, it is important that the teacher have a strong understanding of the mathematics being assessed and the skills to make valid inferences about a student's knowledge and understanding.

The content of the Mathematics Standards of Learning supports five goals for students: becoming mathematical problem solvers, communicating mathematically, reasoning mathematically, making mathematical connections, and representing mathematical ideas. These goals provide a framework for students to learn with understanding, actively building new knowledge from experience and prior knowledge. Therefore, throughout the study of mathematics, students should be encouraged to talk about mathematics, to use the language and symbols of mathematics, to discuss problems, to solve various types of problems in a variety of contexts, and to develop the competence and confidence in themselves as a mathematics student.

Kindergarten Mathematics Standards of Learning Sample Scope and Sequence

The Sample Mathematics Standards of Learning Scope and Sequence should serve as a resource tool for teachers and administrators for developing effective curricula, instruction, and classroom assessment. The degree of success that students have with the Mathematics Standards of Learning will depend upon the school division's implementation of an instructional program that is aligned with the Mathematics Standards of Learning.

Kindergarten Mathematics Standards of Learning Sample Scope and Sequence

Organizing Topics	Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Whole Numbers: Representations & Relationships	K.1 K.2 K.3 K.4 K.5	1.1 1.2 1.3 1.4 1.5 1.7	2.1 2.2 2.3 2.5	3.1 3.2 3.3	4.1	
Whole Number Operations & Estimation: Addition and Subtraction	K.6	1.8 1.9	2.6 2.7 2.8 2.9 2.10 2.26	3.4 3.8	4.5 4.6	5.3
Whole Number Operations & Estimation: Multiplication and Division				3.4 3.9 3.10	4.7 4.8	5.3 5.5
Decimals: Representations & Relationships				3.7 3.12	4.2 4.4	5.1 5.2
Decimal Operations & Estimation: Addition and Subtraction				3.12	4.9	5.4
Decimal Operations & Estimation: Multiplication and Division						5.4 5.6
Fractions: Representations & Relationships		1.6	2.4	3.6 3.11 3.5	4.2 4.3	5.2
Fraction Operations & Estimation: Addition and Subtraction					4.9	5.7
Measurement: Money	K.6 K.7	1.10	2.11	3.13		
Measurement: Length	K.8 K.10	1.12	2.12	3.14	4.11	5.11

Kindergarten Mathematics Standards of Learning Sample Scope and Sequence

Organizing Topics	Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Measurement: Weight/Mass	K.8 K.10	1.12 1.14	2.15	3.14	4.10	5.11
Measurement: Volume (Liquid)		1.13	2.17	3.14	4.12	5.11
Measurement: Temperature	K.8 K.10		2.19	3.17		5.11
Measurement: Time	K.8 K.9	1.11	2.16 2.18	3.15 3.16		5.12
Measurement: Perimeter, Area, Volume, Circumference			2.12 2.7 2.13 2.14		4.13	5.8 5.9 5.10 5.11
Geometry: Two-Dimensional (plane)	K.11 K.12	1.16 1.17	2.22	3.18 3.19	4.14 4.15 4.16	5.13 5.14 5.15a
Geometry: Three-Dimensional (solid)			2.22 2.20	3.18	4.17a,b	5.16
Geometry: Transformations			2.21	3.20	4.17c	5.15b,c, d, e
Geometry: Spatial Relationships	K.13	1.15			4.18	
Statistics: Collect, Organize, Display, Analyze and Interpret Data	K.14 K.15	1.18 1.19	2.23	3.21 3.22	4.20	5.18 5.19
Probability	K.16		2.24	3.23	4.19	5.17
Patterns and Functions: Representations & Relationships	K.17 K.18	1.20 1.21	2.25	3.24	4.21	5.20
Algebra: Representations & Relationships			2.26	3.25	4.22	5.21 5.22

Kindergarten Mathematics Standards of Learning Sample Scope and Sequence

Organizing Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Whole Numbers: Representation & Relationships	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to:**		▪ Classroom Observations ▪ Teacher Interviews ▪ Student Demonstrations ▪ Quizzes and Tests	▪ Manipulatives: base-10 materials, place value charts, Digi-Blocks, cubes, linking cubes, counters, 10-frames, bean sticks, color tiles, Cuisenaire Rods, number cards, money, calculators.
	▪ Match each member of one set with each member of another set, using the concept of one-to-one correspondence to compare the number of members between sets, where each set contains 10 or fewer items. ▪ Compare and describe two sets of 10 or fewer items, using the terms *more, fewer,* and *the same*.	K.1		
	▪ Count orally the number of items in a set containing 10 or fewer concrete items, using one-to-one correspondence, and identify the corresponding numeral.	K.2.a		
	▪ Identify written numerals from 0 through 10 presented in random order. ▪ Select the numeral from a given set of numerals that corresponds to a set of 10 or fewer concrete items.	K.2.b		
	▪ Write the numerals from 0 through 10. ▪ Write a numeral that corresponds to a set of 10 or fewer concrete items.	K.2.c		

Kindergarten Mathematics Standards of Learning Sample Scope and Sequence

Organizing Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Whole Numbers: Representation & Relationships (cont'd)	▪ Identify the ordinal positions first, second, and third, using ordered sets of three concrete objects and/or pictures of such sets presented from -left-to-right; -right-to-left; -top-to-bottom; and/or -bottom-to-top.	K.3		
	▪ Group 30 or fewer objects together into sets of fives or tens and then count them by fives or by tens. ▪ Investigate and recognize the pattern of counting by fives and tens, using 30 or fewer concrete objects. ▪ Investigate and recognize the pattern of counting by fives and tens to 30, using a calculator.	K.4		
	▪ Count forward from 1 to 30. ▪ Count backward from 10 to 1.	K.5		

Kindergarten Mathematics Standards of Learning Sample Scope and Sequence

Organizing Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Whole Number Operations & Estimation: Addition and Subtraction	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to:**		▪ Classroom Observations ▪ Teacher Interviews ▪ Student Demonstrations ▪ Quizzes and Tests	▪ Manipulatives: base-10 materials, Digi-Blocks, 10-frames, cubes, linking cubes, counters, color tiles, Cuisenaire Rods, calculators.
	▪ Combine two sets with known quantities in each set, and count the combined set to determine the sum, where the sum is not greater than 10 concrete items. ▪ Remove, "take away," or separate part of a set from a given set to determine the result of subtraction.	K.6		

Kindergarten Mathematics Standards of Learning Sample Scope and Sequence

Organizing Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Measurement: Money	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to:**		▪ Classroom Observations ▪ Teacher Interviews ▪ Student Demonstrations ▪ Quizzes and Tests	▪ Manipulatives: money.
	▪ Describe the properties/characteristics (e.g., color, relative size) of a penny, nickel, dime, and quarter. ▪ Identify a penny, nickel, dime, and quarter. ▪ Count a randomly placed collection of pennies and/or nickels (or models of pennies and/or nickels) whose value is 10 cents or less, and determine the value of the collection.	K.7		
	▪ Combine two sets with known quantities in each set, and count the combined set to determine the sum, where the sum is not greater than 10 concrete items.	K.6		

Kindergarten Mathematics Standards of Learning Sample Scope and Sequence

Organizing Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Measurement: Length	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to:**		▪ Classroom Observations ▪ Teacher Interviews ▪ Student Demonstrations ▪ Quizzes and Tests	▪ Manipulatives: rulers, blocks, pencils, paper clips, beans, Unifix cubes, Cuisenaire Rods.
	▪ Identify a ruler as an instrument to measure length.	K.8		
	▪ Compare and describe lengths of two objects (as shorter or longer), using direct comparison or nonstandard units of measure (e.g., foot length, hand span, new pencil, paper clip, block). ▪ Compare and describe heights of two objects (as taller or shorter), using direct comparison or nonstandard units of measure (e.g., book, hand span, new pencil, paper clip, block).	K.10		

Kindergarten Mathematics Standards of Learning Sample Scope and Sequence

Organizing Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Measurement: Weight/Mass	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to:**		▪ Classroom Observations ▪ Teacher Interviews ▪ Student Demonstrations ▪ Quizzes and Tests	▪ Manipulatives: pan balances, objects, weights.
	▪ Identify different types of scales as instruments to measure weight.	K.8		
	▪ Compare and describe weights of two objects (as heavier or lighter), using direct comparison or nonstandard units of measure (e.g., book, cubes, new pencil, paper clip, block).	K.10		

Kindergarten Mathematics Standards of Learning Sample Scope and Sequence

Organizing Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Measurement: Temperature	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to:**		▪ Classroom Observations ▪ Teacher Interviews ▪ Student Demonstrations ▪ Quizzes and Tests	▪ Manipulatives: thermometers.
	▪ Identify different types of thermometers as instruments used to measure temperature.	K.8		
	▪ Compare and describe temperatures of two objects or environment (as hotter or colder), using direct comparison.	K.10		
Measurement: Time	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to:**		▪ Classroom Observations ▪ Teacher Interviews ▪ Student Demonstrations ▪ Quizzes and Tests	▪ Manipulatives: Analog play clocks, digital clocks, calendars.
	▪ Identify different types of clocks (analog and digital) as instruments to measure time. ▪ Identify the components of a calendar, including days, months, and seasons.	K.8		
	▪ Tell time on an analog clock to the hour. ▪ Tell time on a digital clock to the hour.	K.9		

Kindergarten Mathematics Standards of Learning Sample Scope and Sequence

Organizing Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Geometry: Two-Dimensional (plane)	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to:**		▪ Classroom Observations ▪ Teacher Interviews ▪ Student Demonstrations ▪ Quizzes and Tests	▪ Manipulatives: Geometric shapes, geo-boards, pattern blocks, attribute blocks. ▪ DOE Geometry for Elementary Teachers Staff Development Guide
	▪ Identify a circle, triangle, square, and rectangle. ▪ Describe the properties of triangles, squares, and rectangles, including number of sides and number of corners. ▪ Describe a circle. ▪ Draw a circle, triangle, square, and rectangle.	K.11		
	▪ Identify pictorial representations of a circle, triangle, square, and rectangle, regardless of their position and orientation in space. ▪ Describe the location of one object relative to another, using the terms *above*, *below*, and *next to*.	K.12		

Kindergarten Mathematics Standards of Learning Sample Scope and Sequence

Organizing Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Geometry: Spatial Relationships	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to:**		▪ Classroom Observations ▪ Teacher Interviews ▪ Student Demonstrations ▪ Quizzes and Tests	▪ Manipulatives: geometric shapes, pattern blocks, tangrams, attribute blocks.
	▪ Compare and group plane geometric figures (circle, triangle, square, and rectangle) according to their relative sizes (larger, smaller). ▪ Compare and group plane geometric figures (circle, triangle, square, and rectangle) according to their shapes.	K.13		

Kindergarten Mathematics Standards of Learning Sample Scope and Sequence

Organizing Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Statistics	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to:**		▪ Classroom Observations ▪ Teacher Interviews ▪ Student Demonstrations ▪ Quizzes and Tests	▪ Manipulatives: objects, one-inch graph paper. ▪ DOE Probability and Statistics for Elementary Teachers Staff Development Guide
	▪ Gather data on given categories by counting and tallying (e.g., favorites, number of days of various types of weather during a given month, types of pets, types of shoes).	K.14		
	▪ Display data by arranging concrete objects into organized groups to form a simple object graph. ▪ Display data, using pictorial representations of the data to form a simple pictorial graph (e.g., a picture graph of the types of shoes worn by students on a given day). ▪ Display information in tables, either in rows or columns (e.g., a table showing the number of bunnies in one column and the number of ears the bunnies have in another, or a table showing the time schedule for classroom activities).	K.15		

Kindergarten Mathematics Standards of Learning Sample Scope and Sequence

Organizing Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Probability	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to:**		▪ Classroom Observations ▪ Teacher Interviews ▪ Student Demonstrations ▪ Quizzes and Tests	▪ Manipulatives: two-color counters, multicolored spinners. ▪ DOE Probability and Statistics for Elementary Teachers Staff Development Guide
	▪ Conduct investigations of probability through hands-on activities such as dropping a two-colored counter or using a multicolored spinner. ▪ Describe verbally, pictorially, and/or with tally marks the outcome of dropping a two-colored counter or using a multicolored spinner (e.g., the number of times the red side of the counter landed up compared to the number of times the counter was dropped).	K.16		

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Organizing Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Patterns and Functions: Representation & Relationships	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to:**		▪ Classroom Observations ▪ Teacher Interviews ▪ Student Demonstrations ▪ Quizzes and Tests	▪ Manipulatives: pattern block, colored macaroni, colored cubes, colored tiles, linking blocks. ▪ DOE Patterns, Functions and Algebra for Elementary Teachers Staff Development Guide
	▪ Sort objects into appropriate groups (categories) based on one attribute, such as size, shape, or color. ▪ Classify sets of objects into three groups (categories) of one attribute (e.g., for size — small, medium, and large).	K.17		
	▪ Observe and identify the basic repeating pattern found in repeating patterns of common objects, sounds, and movements that occur in real-life situations, where there are four or fewer elements in the basic repeating pattern. ▪ Describe the basic repeating pattern found in a repeating pattern, where there are four or fewer elements in the basic repeating pattern. ▪ Extend a repeating pattern by adding at least two repetitions to the pattern.	K.18		